multimedia

IN SAN FRANCISCO

San Francisco Planning Department
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INTRODUCTION

The multimedia industry stirs the imagination of the public, local and regional governments, and media. Its allure is simple. Multimedia is an emerging industry with seemingly unbounded growth potential and high value-added production with few identified environmental impacts. The prospect of increasing tax receipts and creating jobs naturally leads cities and regions financially strapped by federal cutbacks and welfare reform to look at multimedia.

Advances in computer technology have allowed rapid generation and processing of specialized information for businesses and others. As the availability of information increased, accessing and distributing information according to specific tasks became a challenge. Multimedia is an emerging industry that facilitates access to and distribution of information through new communication tools and processes. Multimedia firms develop products or provide services that integrate sound, image, video, or text into a form tailored to specific user needs. These products and services allow the user to interact with that information.

> Multimedia is an emerging industry with seemingly unbounded growth potential and high value-added production with few identified environmental impacts.

Despite widespread enthusiasm, there have been relatively few in-depth studies of this emerging and dynamic industry that can be used to formulate local policies. Most studies fail to grasp the very dynamic nature of multimedia. Multimedia is a complex network of both new and old and of converging and diverging industries. It is both creating new industries and transforming others. Building intranets, for instance, creates a market where none existed prior to the Internet. On the other hand, printing firms integrating multimedia processes represent a change in a mature industry. These lines are easily crossed. Traditional graphic designers, for example, may expand into multimedia, or video production companies may evolve into multimedia producers. Policy makers need to understand these subtleties if they intend to promote multimedia for the purposes of economic development.

San Francisco has a high concentration of multimedia firms. By most accounts, San Francisco has either the highest or second highest number of firms, with New York City competing for the prestige of being the nation's multimedia capital. The San Francisco Planning Commission has an ongoing role and interest in understanding economic trends in the City, and its actions can influence those trends. During recent discussions about the City's economy, commissioners identified multimedia as a sector that could have employment and land use implications. They asked staff to provide more information. Mayor Brown's recent Economic Summit also identified multimedia as an industry with growth potential that San Francisco should foster. The San Francisco Redevelopment Agency is also exploring these issues in the context of its programs. It has undertaken a large-scale data collection effort about San Francisco's multimedia firms. These complementary efforts will help the City formulate policies or programs to promote job creation and revenue generation and to minimize unwanted impacts.

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The purpose of this study is to understand the nature of the multimedia industry in San Francisco, to explore its economic and spatial organization and its role in the life of the City, and to begin to understand the choices and challenges the City faces in promoting the development of multimedia businesses. The Redevelopment Agency's efforts will provide more specific quantitative information on business transactions and needs.

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This study is based on a diverse set of data sources. The main source of information about the size and distribution of the multimedia industry in San Francisco is a data base of about 750 businesses engaged in some level of multimedia activity. This data base was compiled between October 1996 and February 1997 and developed from multimedia business directories, Internet searches, telephone directories, and data bases from the Multimedia Development Group, South of Market Foundation, and San Francisco Planning Department. About 400 of the 750 businesses were contacted over the telephone or Internet to gather information on business type. This information was complemented by a short survey and in-depth interviews of about 35 businesses as well as a review of 30 multimedia businesses' Web pages. These additional sources provided information about the organization of businesses, multimedia products, labor skills, and

space requirements among other issues. Previous studies were used to characterize the industry nationwide.

Based on an analysis of the data base and on follow-up interviews with a smaller number of firms, we conclude that:

1. Multimedia in San Francisco is difficult to measure and characterize because it is new, evolving, and does not fall neatly into conventional categories.

2. We have defined multimedia as an industry that facilitates access to and distribution of information through new communication tools and processes. Multimedia firms develop products or provide services integrating sound, image, video, or text into a form that allows the user to interact with that information. Applying this definition, San Francisco now has about 410 core multimedia firms. These firms typically have about seven employees, although a few are much larger. Employees are more likely to live in San Francisco than are employees in the northeastern quadrant of the City. In addition, about 300 more firms identify themselves with the multimedia industry and have incorporated multimedia techniques into their operations or products, or supply goods and services to the multimedia industry.

3. These numbers are not large in relation to San Francisco's economy. However, multimedia firms have many ties to other activities in San Francisco, the region, and beyond, adding to their economic value to the City. Relationships with clients are of particular importance, including advertising firms, the film industry, and large corporations in the Financial District and Silicon Valley. Another vital relationship exists with communities of artists, technical specialists, and other multimedia firms in San Francisco. The City's prestige is enhanced by these relationships.

4. Core multimedia firms are usually young, less than 10 years old, and without large capital reserves. Their workload changes rapidly, making them extremely vulnerable to changing economic and market conditions.

5. Multimedia firms are concentrated in Downtown and South of Market, where they have developed a distinctive district, "Multimedia Gulch." South of Market's advantages include, in addition to the concentration of interdependent firms, the area's traditional association with the arts, a stock of industrial/warehouse buildings easily converted to appeal to multimedia firms, a network of fiber optic cables, close proximity to Financial District clients, easy access to CalTrain and Silicon Valley, and urban amenities such as restaurants, cafes, and South Park.

6. Multimedia has flourished in San Francisco because of the City's ability to supply these advantages. In the future, advances in telecommunications will give these firms additional location options, especially for more routine tasks. However, high-end multimedia firms, those which depend on creativity and innovation to add value to their product, will continue to be attracted to San Francisco if the City maintains its advantages. These companies, which give the industry its vitality and San Francisco its cachet as a multimedia center, can continue to play an important role in San Francisco's economy and culture.

MULTIMEDIA PRODUCTS AND SERVICES

Multimedia, more than other industries, is constantly redefining its products and services. The industry lacks precise boundaries and is best approached as a set of activities in transition. This section provides a snapshot of the industry today. These categories do not exhaust all the possibilities, rather they are useful categories for an industry with very fluid boundaries.

The multimedia industry may be represented as a series of concentric circles which for the purpose of this study have been defined at three levels: core multimedia activities, multimedia tools and applications, and support services. At the center are core multimedia firms which create digital design, public art installations, Internet services, virtual communities, digital entertainment, film post-production,

Table I
Multimedia businesses in San Francisco, 1997
Distribution by activities

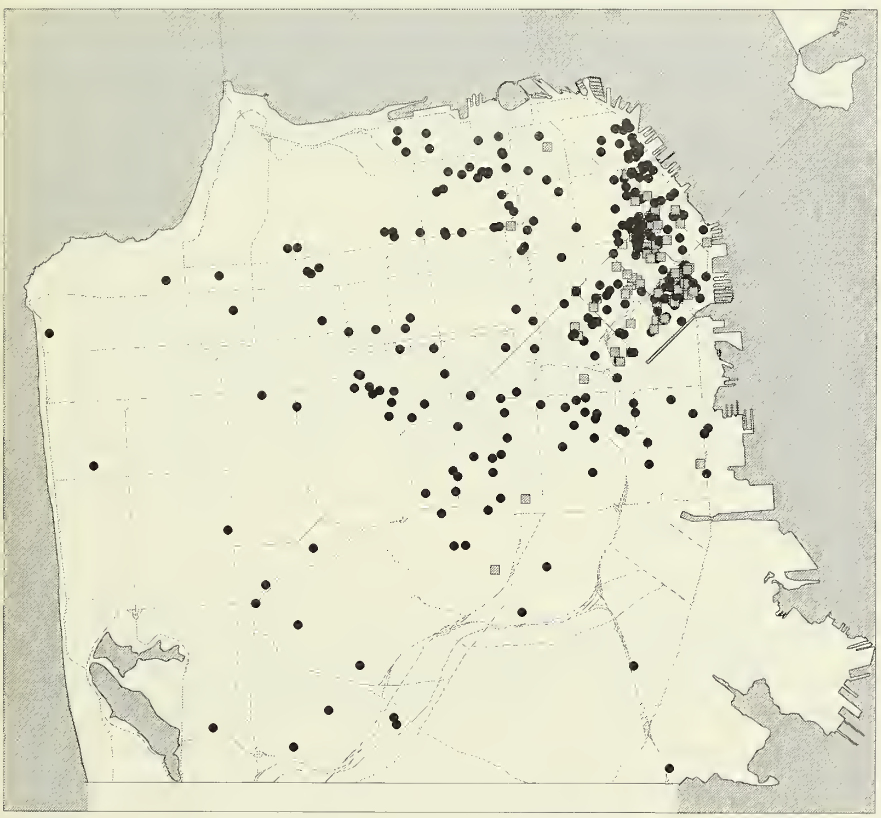
Core multimedia activities (content and service provision)	407	56.0%
Multimedia tools and applications (firms in corporating multimedia tools and applications)	119	16.4%
Support services:	201	27.6%
Computer services (training, hardware, consulting)	118	16.2%
Film and photography, non-digital	25	3.4%
Business services (legal, financial, accounting, advertising)	58	8.0%
Total	727	100.0%

Sources: San Francisco Planning Department
South of Market Foundation
Multimedia Development Group

among other products and services. These core firms have been nurtured by computer and communication technologies, the film industry, and arts. They provide services and products that are delivered in digital format and have no precedent in other industries. We have identified 407 multimedia core businesses, 56% of all multimedia businesses identified in San Francisco. The boundaries between core and non-core multimedia businesses are constantly changing. Often non-core firms evolve into core multimedia activities. A graphic designer may begin to build Web pages for example. Still, it is useful to identify the elements that represent new growth, new products, and new activities, in order to understand accurately the contributions of the multimedia industry to the economy.

New Activities and New Products - The Core

Among the core multimedia firms there are two main functions: content providers and service providers. While many firms engage in both, these functions are relatively distinct. Content providers create concepts and designs. Service providers execute the concepts or designs that are provided by their client. For example, a company that



Multimedia Business Types
□ Multimedia Tools
● Core Multimedia

Map 1

San Francisco Multimedia Businesses: Core Multimedia and Multimedia Tools

produces educational CD-ROMs is a content provider. Staff-members develop new ideas, then work with in-house design staff to turn the idea into a game.

In contrast, a Fortune 500 corporation that needs an intranet might approach a service provider to create one. The idea is provided by the client and executed by the multimedia company. Film post-production companies usually fall under this category as well. An advertiser or video maker knows what effect is needed and hires a service provider to create it.

The distinction between content and service providers is useful to understanding the variety of staffing, skills, capabilities, legal support, and investment types. However, these two functions are not isolated from each other. Often a creative idea may be hammered out in sessions between the client and multimedia company, and in almost every case a multimedia company provides some degree of creative input.

Digital Design

"Digital design" means turning a concept into an electronic image that is sharp and attractive. Digital design requires creative and artistic talent along with mastery of graphics and development tools. Unlike traditional graphic design, animation and three-dimensional design are increasingly common features of the final product. Digital design is often part of a larger product, such as a Web page or electronic kiosk (interactive kiosks for shopping, displaying information, etc.).

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Internet Services

"Internet services" is a broad category for services that help companies or individuals use the Internet. An Internet service company may help a corporation set up an intranet so that employees can use the Internet as an internal communication medium. A bank may need a system to allow its customers to access their accounts through the Internet, or an Internet shopping Web site might need a tool to verify credit card numbers. The possibilities are as varied as the companies providing these services.

Virtual Communities

Virtual communities are an invention of the Internet. A virtual community is an organized, virtual forum for sharing ideas, resources, and information. Businesses that serve virtual communities often provide access to information that may otherwise be difficult to obtain. For example, Synergistic Designs, a San Francisco firm, provides up-to-date information on the biotechnology and biopharmaceutical

industry to its subscribers. They post industry news, job openings, and conference proceedings. While not strictly a "community," Internet shopping companies fall under this category.

Film Post-Production

Post-production is on the outer edge of the core of multimedia. Post-production involves the creation of special multimedia effects for television, film, and video. Much video and film editing is done digitally. Effects are created using multimedia tools, requiring the same skills as other categories of the multimedia core, but the final product may not be in digital form.

Multimedia Tools and Applications - Transforming Traditional Industries and Products

Firms in the ring surrounding the core use multimedia as a tool, but by and large their output is not digital. There are 119 business firms using multimedia tools and applications (16% of the total number of multimedia businesses). In contrast to core multimedia firms, these firms are often from industries that existed before multimedia. Their products, which are typically not digital, do not necessarily change with the incorporation of multimedia tools and applications. Examples of these firms include printing and lithography, graphic design, film and video production, photographic services and copy shops. Many of these non-core firms are in the process of diversifying into core multimedia markets, blurring the distinction between core and non-core firms.

Printing and Lithography

Printing and lithography firms increasingly use sophisticated electronic design processes to prepare pre-press. From the pre-press, hard copies are produced using chemical or mechanical processes.

Graphic Design

Most graphic designers have changed their tools to take advantage of improvements in computer software and hardware. Desktop publishing and graphics programs have dramatically increased in sophistication. Today, their services and products are often a mixture of traditional graphic design and multimedia.

Film, Video, and TV Production

Film and video production have also incorporated digital processes. For the most part, film and video companies use non-digital formats for their end-products, but editing and special effects are created using multimedia tools. This distinction, however, is becoming even more tenuous as the final outputs shift toward digital formats, such as Internet TV or DVD (digital video disk).

Photographic Services

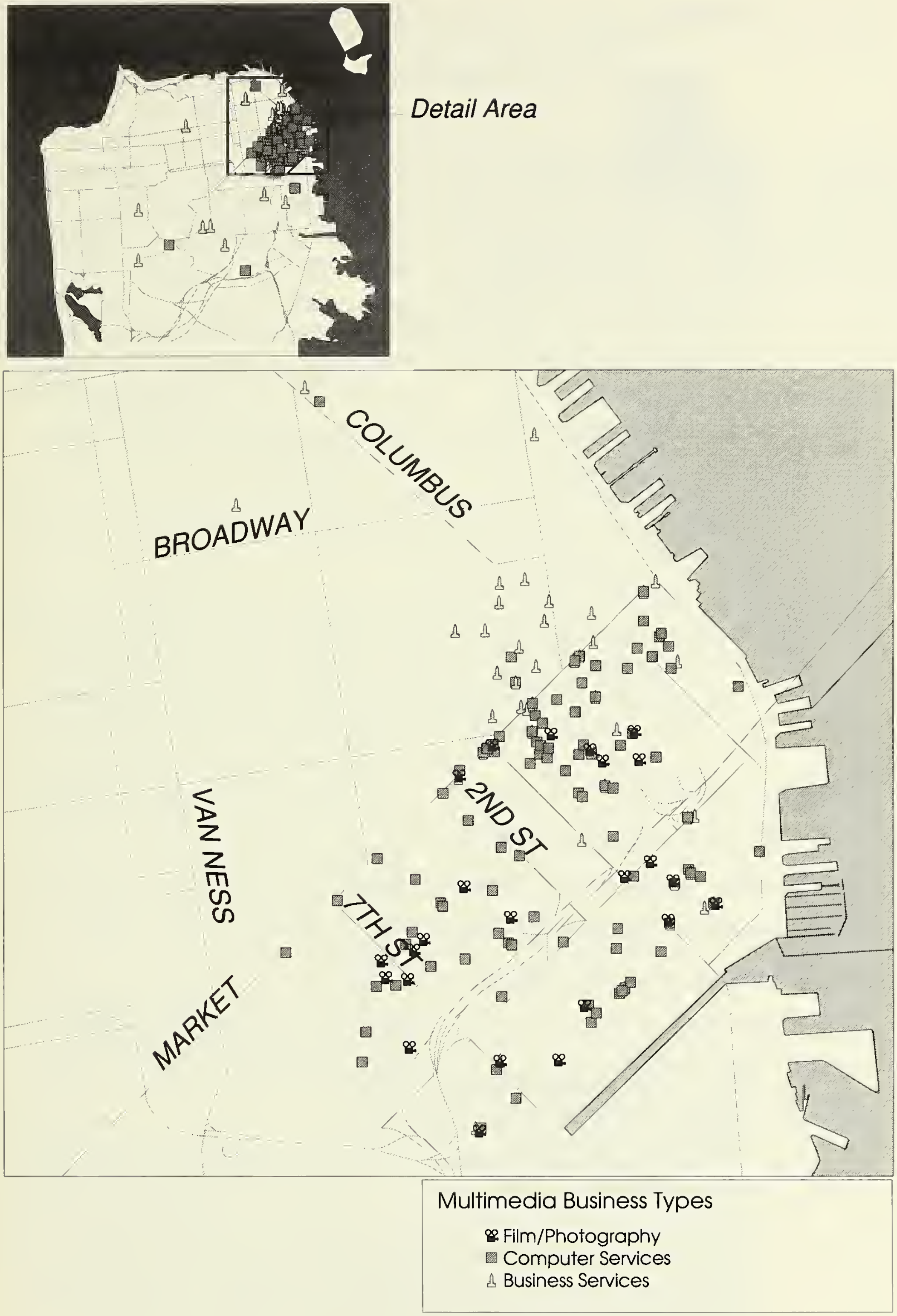
While some photographic services continue to provide traditional services such as printing, enlargements, or restoration using traditional techniques, others have begun to use new multimedia tools and processes. Photographs can be stored in CD-ROMs and manipulated digitally, then printed, or a poster may be scanned and turned into a slide.

Copy Shops

Even copy shops have begun to offer basic multimedia services, such as scanning and altering photos or digital files. But copy shops are on the periphery and do not usually provide highly specialized multimedia services. The distinction, though, between copy shops and service bureaus is becoming increasingly blurred.

Support Services

The third peripheral circle consists of firms that provide support services for multimedia activities and identify themselves by their relationship to multimedia. These firms include computer services, traditional non-digital film and photography, and business services such as accounting, legal, and financial services. We identified 201 firms in this category.



Map 2

San Francisco Multimedia Businesses: Support Services

MULTIMEDIA IN SAN FRANCISCO

Although multimedia is a high-profile industry, the numbers of firms and their workers in San Francisco are still relatively small. There are about 410 core multimedia businesses located in San Francisco. About 120 related firms use multimedia tools and applications in more traditional sectors, and about 200 firms supply services to the multimedia industry and identify themselves with it. We have estimated that core multimedia firms average about seven employees. This figure does not take into account a very few large firms, or individuals who do not appear in business directories or present themselves as "firms." We estimate that there are 3,000 employees of core multimedia firms. Firms that are involved in multimedia but are not in the core are harder to characterize, ranging across many economic sectors.

Although multimedia is a high-profile industry, the numbers of firms and their workers in San Francisco are still relatively small.

Multimedia firms do not fit well in any of the typical categories used to characterize businesses and gather data about them. Although some use equipment and space in ways more like traditional "Industrial" firms, it is probably reasonable to consider them as part of "Business and Professional Services." This was a leading sector as San Francisco emerged from the recession of the early 1990s and has been a vigorous and growing sector since then. In 1995 it represented about 102,200 jobs in San Francisco, or 19.5% of the City's 524,100 jobs. Between 1983 and 1995, Business and Professional Services grew by 20.5% while total San Francisco employment dropped by 3.7%. (Although San Francisco has had overall employment growth since 1993, it has not yet reached the levels of the 1980s.)

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Within the South of Market, businesses in the Standard Industrial Classification (SIC) codes that most closely fit the definition of core multimedia had an average sales per employee of about $142,000 in 1996, as reported by Dun and Bradstreet. For comparison, this is lower than the Finance, Insurance, and Real Estate average of about $317,000 and higher than the Engineering, Architectural, and Accounting Services average of $95,000. Assuming an average size of seven employees, core multimedia firms generated about $62.3 million in sales. It is more difficult to estimate the sales of related non-core firms because of their diversity. In 1995, the Controller reported total gross receipts Citywide of about $27 billion.

Many multimedia firms cluster around a relatively small area within the South of Market district which has been dubbed "Multimedia Gulch." About 360 multimedia businesses (49%) are concentrated in South of Market, 200 businesses (27%) in the Downtown-Civic Center Area, 60 businesses (9%) in the Mission-Noe Valley-Potrero Area, and 110 businesses (15%) in the rest of the city. South of Market has the highest concentration (41%) of core multimedia businesses, 70% of multimedia tools and applications businesses, and 55% of support services businesses.

Many multimedia firms cluster around a relatively small area within the South of Market district which has been dubbed "Multimedia Gulch."

Unlike traditional industries, the concentration of multimedia businesses cannot be explained by the costs of transporting products, since such costs are absent or low. Explanations relying on the location or price of industrial supplies are also inadequate. Multimedia is created with standard software and hardware readily available throughout the country. Moreover, San Francisco's land and labor costs are typically higher than those of other cities.

Many factors contribute to the clustering of multimedia firms in downtown San Francisco and adjacent neighborhoods to the south, especially South of Market. The dynamic artist community, the need for multimedia businesses to interact and exchange resources in the process of innovation, the availability of warehouse-office space, access to fiber optic cables and servers, and San Francisco's proximity to high technology resources in Silicon Valley and the film industry in Marin County are some of the unique qualities that San Francisco in general, and this area in particular, can offer multimedia firms. An understanding of San Francisco's specific advantages to the multimedia industry will inform city agencies and community organizations about alternative approaches to take to foster the industry. The following sections contribute to this understanding by looking at the organization of businesses and workers, sources of innovation in relation to the local community, space availability, and access to markets and services.

Many factors contribute to the clustering of multimedia firms . . . . The dynamic artist community, the need for multimedia businesses to interact and exchange resources in the process of innovation, the availability of warehouse-office space, access to fiber optic cables and servers, and San Francisco's proximity to high technology resources in Silicon Valley and the film industry in Marin County . . . .

Table 2
Multimedia businesses in San Francisco, 1997
Distribution by district and type of business

Number of businesses

Districts	Core Multimedia	Multimedia Tools	Support Services	Total
South of Market	165	83	111	359
Downtown-Civic Center	92	30	75	197
Mission-Noe Valley-Potrero	53	2	7	62
Marina-Fillmore	42		1	43
North Beach-Chinatown-Van Ness	24	3	3	30
Rest of the city	31	1	4	36
Total	407	119	201	727

Percent distribution by district

Districts	Core Multimedia	Multimedia Tools	Support Services	Total
South of Market	40.5	69.7	55.2	49.4
Downtown-Civic Center	22.6	25.2	37.3	27.1
Mission-Noe Valley-Potrero	13.0	1.7	3.5	8.5
Marina-Fillmore	10.3	0.0	0.5	5.9
North Beach-Chinatown-Van Ness	5.9	2.5	1.5	4.1
Rest of the city	7.6	0.8	2.0	5.0
Total	100.0	100.0	100.0	100.0

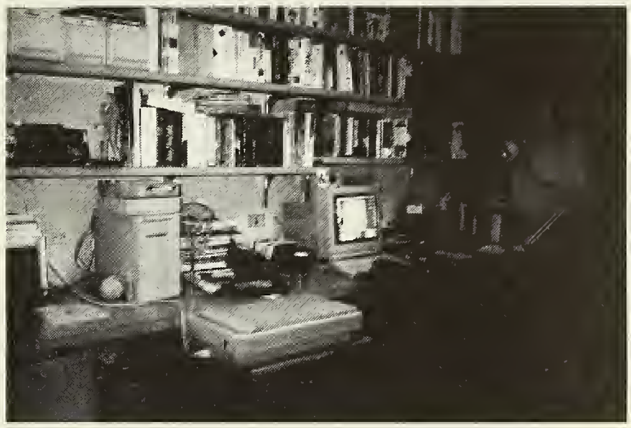
Percent distribution by business type

Districts	Core Multimedia	Multimedia Tools	Support Services	Total
South of Market	46.0	23.1	30.9	100.0
Downtown-Civic Center	46.7	15.2	38.1	100.0
Mission-Noe Valley-Potrero	85.5	3.2	11.3	100.0
Marina-Fillmore	97.7	0.0	2.3	100.0
North Beach-Chinatown-Van Ness	80.0	10.0	10.0	100.0
Rest of the city	86.1	2.8	11.1	100.0
Total	56.0	16.4	27.6	100.0

Sources: *San Francisco Planning Department*
South of Market Foundation
Multimedia Development Group

ORGANIZATION OF BUSINESSES AND WORKERS

The current growth of multimedia firms in San Francisco results from the unique needs and demands of the industry. These unique needs are in part based on how the industry is organized and how it provides products and services. There are two important trends in the organization of this industry that have facilitated innovation in multimedia products and services: small businesses and access to skilled and flexible labor.



There are two important trends in the organization of this industry that have facilitated innovation in multimedia products and services: small businesses and flexible labor as well as freelancing and subcontracting.

Small Businesses

The multimedia industry is relatively young and relies on technological innovation and creativity. Most multimedia firms in San Francisco are startups. About three-quarters of core multimedia businesses started between 1990 and 1997. Core multimedia firms also tend to be small. The estimated average employment size of these firms is about seven, excluding large software companies. The average building space they occupy is about 3,000 square feet. The small size of these companies allows them to respond flexibly to the unpredictable volume and nature of projects. At the same time, the availability of a skilled work force allows these businesses to expand through temporary employees or subcontracting as needed by specific projects.

Multimedia is a high-risk business. Their small size and the ebb and flow of projects leaves

these firms vulnerable to economic trends, changes in technology, shifts in personnel, and the whims of fortune. Although this study did not track firms over time, interviewees reported, and their relatively young age indicates, that firms grow, shrink, and fail more dramatically than firms in conventional businesses.

These small multimedia companies have many connections with each other. They are spatially concentrated to facilitate interactions among firms as well as with clients. They tend to share resources, information, and equipment, allowing them to become more specialized. Multimedia firms routinely rent the production facilities of related firms on an as-needed basis.

Multimedia firms rely more on word-of-mouth or Web postings than on traditional marketing strategies and advertising. They, especially content providers, interact frequently with clients in developing multimedia products and services.

The horizontal networks of the multimedia industry are not limited to small businesses; they also involve large firms, often as clients. Multimedia content providers may come up with an idea, develop a prototype, then shop it to a large company client. Alternatively, a large company might put up the money and set milestones for the multimedia company, acting as the "executive producer" overseeing every aspect of product development. For example, a variety of "shrink-wrapped" products are developed by several companies in South of Market exclusively for the Sony Playstation. For some game developers, Sony is the sole client. In this situation, client relations are critical, involving extensive communication about concept and content.

In a few cases multimedia businesses in San Francisco operate within a more vertically integrated structure, especially in the provision of services, by customizing services for large financial corporations, advertising companies, or large entertainment firms. Large corporations with steady need for multimedia services in-house may begin to build up their own capacity. For example, CGI was recently purchased by IBM and became IBM's in-house multimedia unit.

Employees, Freelancers, and Contractors

The relationships between workers and firms in the multimedia industry are more fluid than those in traditional firms. There is an unpredictable ebb and flow of work in which each project may require different expertise and different levels of labor. The relationships among contractors, employees, and firms change often. Freelancers frequently become full-time employees, while enterprising employees and freelancers start up their own firms.

The size and quality of the labor pool available to multimedia firms in San Francisco, including freelancers, are essential elements in the structure of the industry. While we have no precise numbers on the actual size of the contractor labor pool, information from interviews suggests that freelancers perform much of the work in multimedia firms. This labor pool is an example of a locational economy: the entire industry benefits from a high number of multimedia firms in the same city. The high concentration of firms enables them to share the same floating labor pool, which an individual firm could not support. The high number of firms increases the chances that someone with the necessary skills can find work. Without such large-scale demand from numerous small firms, freelancers would not be able to tolerate the uncertainty of employment. Firms would lose the flexibility to form and reform teams to carry out specific projects.

"When a project is beginning, the concept isn't clearly designed, so you need to sit with the client to discuss the project and determine budget limits. They need to talk out the project."

The size and quality of the labor pool available to multimedia firms in San Francisco, including freelancers, are essential elements in the structure of the industry.

The fluid nature of work in multimedia makes collecting data about employment imprecise. The point made most strongly by the employers who were interviewed is that they require high technical skills and flexibility, and that they depend on local workers.

Direct and Electronic Communication

Face-to-face contact

Word-of-mouth is a vital form of communication for small firms and freelancers. In fact, every freelancer whom we interviewed reported finding work through word-of-mouth; none had found work through cold-calling or mailing résumés. Firms also find freelancers in the same way.

"Subcontract work is generally done on a handshake. There's a good amount of trust. I usually work with the same firms."

A Chicago based post-production company could work with an actor in Los Angeles. The actor went to a sound studio that had a fast line connection, recorded a voiceover, which was then transmitted to Chicago.

A freelancer summed up why he goes to user groups with a laugh, "There's always a need to go to a user group - networking, learning something new, and to socialize. You need to be around other people. If you meet face-to-face there's less of a chance they'll flake on you."

In this system of informal networks, personal recommendations are critical. The trust in a colleague's or friend's judgment reduces the need for protracted job searches and elaborate reviews of portfolios. Moreover, a common understanding of levels of proficiency and talent needed for a given project form de facto standards for multimedia. In cases where firms do advertise for jobs, common understanding of standards tends to break down, and conventional résumés may not always reflect a person's abilities in a work situation. Because the necessary skills may be difficult to describe and measure, personal connections and word-of-mouth can often be more effective ways to match the expectations of a firm and freelancer.

Multimedia companies also rely on informal networks to assemble a team because the projects need to be completed extremely quickly. Under such pressure, companies need to be sure that the talent with whom they contract is good. Personal networks are helpful because companies might be uncomfortable asking an unknown freelancer to work under such demanding pressures, and, conversely, freelancers might be unwilling to work under such pressure for an employer they do not know.

Informal communications also play a vital role in helping companies find clients and market their products. Small firms may lack the resources for marketing and advertising, so they rely on word-of-mouth and the Web to find clients. An interviewee observed that ". . . having lunch in the park, eating in the cafes and restaurants" helps "make connections to potential clients."

Face-to-face meetings are most important at the beginning of a business relationship when the client and multimedia firm must negotiate the concept, content, and budget of the project. An interviewee who does post-production for TV and film explains why physical proximity to clients is crucial. "We do supervised work. Clients need to come to the facility because it's creative and visual." Creative work involves communication that does not readily lend itself to telephone, fax, or e-mail. The difficulty of communicating through non face-to-face means in large part explains why such industries cluster near their clients.

In some cases, clients award contracts to multimedia firms based on bids. Face-to-face contact may be the decisive difference in an attempt to win a bid. Such contact is also important not only to win the contract but also to bid correctly.

Word-of-mouth can play such a central role in San Francisco's multimedia industry because firms and people are located in a concentrated area, and, more importantly, people in multimedia spend time around each other. The constant movement of freelancers between firms facilitates the dissemination of information and expands the

network of acquaintances. Relationships often extend beyond work. One interviewee commented that "animators hang out with animators." A freelancer added, "just about all of my friends are multimedia gearheads."

Electronic Communication

At the same time that direct, informal communication is a characteristic of the industry, the technologic bent of multimedia means that electronic communication between firms, clients, employees, and contractors is also very important. Multimedia can be freed from geographic constraints. Interviewees reported projects where they worked "virtually" with a programmer located far away from San Francisco. Telecommuting within the Bay Area is common. One employer reported giving his employees the option of coming into the office and noted increasing levels of telecommuting. Another said that most of his contractors work in the office, but his policy is to give them flexibility by letting them telecommute.

At the same time that direct, informal communication is a characteristic of the industry, the technologic bent of multimedia means that electronic communication between firms, clients, employees, and contractors is also very important.

Communications infrastructure dictates what kinds of electronic communication can occur. Existing telephone lines allow information to be sent and received. Together with the Internet, this infrastructure enables multimedia to be truly interactive. One can order goods, retrieve information, download software, or listen to music over the Internet. As multimedia shifts to the Internet, communications infrastructure plays an increasingly important role in the development of the industry.

The main constraints to exploiting the communications infrastructure for both production and development of new products and services, however, are technological limitations on the amount and speed of data that can be handled by the Internet. While fiber optic lines cover some parts of San Francisco well, especially the Financial District and the South of Market, most buildings lack access to these lines. Traditional phone lines to the "curb" are the principal bottleneck to faster line speeds in areas where fiber optic lines have been installed. Firms may purchase alternative, high speed lines such as ISDN, T1 or T3 connections (ISDN is the slowest and T3 is the fastest). The costs of installing these lines, however, are virtually prohibitive for small start-ups,

ranging from $800 to $1000 per month for a T-1 line, according to one interviewee. Access to such high-speed lines is critical for multimedia firms. As a result, affordable access to such lines plays a decisive role in a firm's location. Several firms reported that they chose a particular building because it was wired with a fast, usually a T-1 or T-3, connection. One common way firms reduce access costs is by locating in a building with an Internet service provider (ISP), a company that sells Internet access. ISPs require extremely fast lines because they are a node through which others access the Internet. Multimedia companies that locate in the same building can share a connection with an ISP by running a wire from their office directly into the ISP's connection, thereby avoiding the costs of installing their own line. Several firms reported that they "just run a cable into the ISP across the hall." They are willing to pay higher rent because they save money by not having to pay for their own dedicated connection. In return for such access, they can trade services with their ISP.

There are, however, limitations to virtual communications. Because current technology limits transfer of large files, data intensive work cannot be handled on the Internet. In particular, video, film, animation, and TV require fast line connections. While many companies have or are acquiring such connections, freelancers often cannot afford such large investments and therefore cannot telecommute.

Regional Connections

Silicon Valley and the region's universities also contribute to the spirit of innovation, in which people and companies are open to technological change and experimentation. An interviewee described Silicon Valley's influence: "It's nice that Silicon Valley is close because it 'ups the ante.' Silicon Valley is the first place that started doing everything electronically. The dominance of the equipment impacts you. You keep a technological edge. . . . It's pervasive." This openness to technology also translates into a willingness to use multimedia. Demand for multimedia services and products in Silicon Valley is high. One manager of a multimedia firm observed that since "Silicon Valley is the source of high-tech, firms there would be the most likely to use it internally," and to be clients of San Francisco multmedia firms.

The geographic proximity of San Francisco's multimedia companies also provides Silicon Valley with effective and efficient feedback on their new software and hardware products: multimedia developers are the users of their products and San Francisco's many small companies can easily test prototypes before they are released into the open market. For example, as soon as Marimba develops its "push" technology prototype, a multimedia company in San Francisco will be ready to use it.

Venture capitalists that have focused on high-tech in Silicon Valley are also likely to be more open to investing in multimedia. Interviewees believed that there is, relatively speaking, a good supply of venture capital. Few firms, however, either sought or received venture capital investments. Some commented that it is too time consuming to write up business proposals and to satisfy the demands of investors. Other young firms often began with personal savings, since multimedia production can have low startup costs. If, however, multimedia becomes more capital intensive when it shifts toward content involving complex productions, venture capital will play a more critical role.

International Connections: A Worldwide Reputation

At the international level, San Francisco greatly benefits from the fact that it is already perceived as a multimedia center. The location of Silicon Valley has made the entire region the technology capital of the world, and that reputation is expanding to include multimedia. At the Center for Electronic Art, which offers classes in multimedia, approximately 15% of the students come from Japan. Other firms have hosted groups of Japanese businessmen touring the renowned "Multimedia Gulch." Multimedia firms are attracted to San Francisco to benefit from this reputation. They believe that companies will look here first for collaborators on projects since San Francisco is known worldwide as the "talent hub." Freelancers may also decide to locate in San Francisco because of its reputation.

At the international level, San Francisco greatly benefits from the fact that it is already perceived as a multimedia center.

The value of San Francisco's reputation is difficult to quantify. Interviewees believe that it is significant. San Francisco can exploit this reputation to both attract more multimedia firms and international investment.

INNOVATION AND COMMUNITY

Creativity

Multimedia products are not generic commodities that compete on the basis of price. Design, content, or specialized technical expertise generate value. As a result, the artist community including painters, film makers, actors, writers, poets, dancers, musicians, architects, and graphic designers is at the center of multimedia. San Francisco's strength as a center for the arts attracts multimedia firms and gives San Francisco an advantage over competing locations. It is no coincidence that multimedia firms are so heavily concentrated in SOMA, the neighborhood most populated by artists.

The overlap between artistic people and multimedia cannot be overemphasized. The majority of interviewees had a background in the arts. One studied film making at the San Francisco Art Institute before becoming a freelance animator and is now considering starting his own firm, having already registered a company name. One interviewee studied piano, organ, and music composition before getting into sound effects for multimedia. Another has an MFA in play writing, worked in avant-garde theater, taught a writing workshop, and does freelance writing. Her career as a writer includes work in multimedia. Previously, she had never worked for a corporation or in an office. She believes that multimedia benefits local artists by providing income, especially critical now that arts funding is harder to obtain. An actress she knows, for instance, earns $250 a week for full-time, unionized theater work. When she does voiceovers for multimedia companies, she earns $125 an hour. Another interviewee does not know any artist who has not earned money from multimedia.

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In addition to people associated with the arts, the proximity to Silicon Valley provides

access to a vast number of innovative computer experts in hardware and software. Not only does this labor pool help support multimedia, in some cases former Silicon Valley employees start new multimedia companies. Several interviewees are veterans of large Silicon Valley firms who have started their own companies and have maintained their contacts with former colleagues.

Community and Communication

The South of Market multimedia community facilitates the exchange of information and contributes to the development of an innovative, cooperative atmosphere. This sense of community permeates virtually every aspect of multimedia and plays a decisive role in the clustering of multimedia businesses in South of Market. The creative nature of multimedia production and the fluid nature of the industry contribute to the need for face-to-face interaction between the participants and for an easy, informal social setting. The multimedia production process benefits from close physical proximity of all participants.

A group of local poets are setting up an on-line poetry magazine. They did a search for on-line poetry magazines and found that there are already more than fifty in existence, mainly in Los Angeles and San Francisco. Another local artist used to run a non-profit theater, then received a grant to start "Joe's Digital Diner," a company that offers multimedia classes.

The result is a distinctive culture and community. Multimedia, for the most part, is young, hip, and counter cultural, especially around SOMA. In a way it is an extension of the bohemian culture of artists in SOMA pre-dating multimedia. People frequently work alternative hours, dress casually, interact informally, and occupy warehouse space decorated unconventionally.

Of course, every firm does not conform to this image. Some multimedia companies in the Financial District operate like any other large, formal corporation. Some Financial District firms include multimedia services as part of a wide range of consulting services. The atmosphere can be formal, and clients are often Fortune 500 companies. Nonetheless, there is generally a widespread spirit of openness and informality in multimedia, which plays an essential role in its functioning. At the most general level, a sense of community binds together multimedia firms.

The lack of strict occupational segmentation contributes to the sense of community and trust. The boundaries between full-time employees, freelancers, and multimedia firms are fluid. As a result, a mutual understanding exists between firms and freelancers, managers and employees, and employees and freelancers. One freelancer said that he will sometimes work for less if he knows that the company he's working for is financially strapped. Managers often make agree-

ments with freelancers on a handshake. This propensity to believe in the good faith of both the employer and freelancer undergirds word-of-mouth.

Community also takes on more concrete forms in San Francisco. The best example is the user group. User groups are gatherings where users of a particular software package or development tool come together to discuss their experiences. Participants may discuss problems and solutions, shortcuts, the features of a new version of software, and good sites to get other information. The value of the user group is that it allows people doing the same thing to get together and discuss common issues. While valuable technical information is exchanged, user groups often serve as a place for socializing and networking. Multimedia companies often recruit employees and freelancers from these groups. User groups also act as informal training grounds, by initiating new users and increasing the collective knowledge of the participants.

In San Francisco, Macromedia, which produces a widely used three-dimensional development tool, is the site for a monthly user group. Like most user groups, the one at Macromedia is very informal. In fact, Macromedia does not really sponsor the group, but simply allows users to congregate in its lobby. Several hundred people can show up for a meeting. In addition to sharing information and networking, participants get to preview prototypes and offer feedback on product improvement. This forum offers the opportunity to keep abreast of the newest technological changes as well as the opportunity to influence product development.

These events and other social events bring people in multimedia together and allow them to make invaluable face-to-face contact. The distinction between what happens inside the firm and what happens outside of it is blurred. One beneficial outcome is a collective learning process and awareness of industry trends.

CHANGES IN TECHNOLOGY AND PRODUCTS

Technological advances constantly change the way multimedia is produced as well as how firms locate. There are two opposing trends which will impact San Francisco. Increased availability and use of electronic communication will make locating in a high-cost area like San Francisco less important to some firms. On the other hand, San Francisco offers qualities that multimedia firms value: proximity to creative people and quality of life. The way that these two trends evolve in San Francisco and San Francisco's response to changes in the multimedia industry will help determine multimedia firms' locational decisions. While routine tasks can increasingly be carried out anywhere, some concentration of cutting-edge multimedia will continue in San Francisco because of the contribution that face-to-face contact can make to creativity and innovation. If San Francisco can capitalize on its strengths in multimedia, those which encourage and benefit from the concentration of the industry, it will be able to maintain its important role in this growing industry.

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Trends toward Dispersal

As technology advances, allowing larger amounts of data to be sent increasingly quickly over the Internet, more large projects such as video and television will be more easily transmitted over the Internet. One result will be increased "virtual collaboration" for all types of projects, as the time needed to download and send large files decreases.

Moreover, the creative process itself may become increasingly mediated by the Internet. Video conferencing, for example, may diminish the need for face-to-face contact at all stages of production. Technology linking computers, also known as "white board," will allow two separate parties to see the same thing on two screens with edits being displayed on both simultaneously. As a result, firms will be less and less dependent on the advantages of geographic clustering. One man-

ager predicts that at some point his firm, as well as the entire industry, will ship more routine jobs overseas to take advantage of cheaper labor. Many interviewees feel that technology will allow firms and freelancers to locate in a wider range of locations. Another manager said that "it will be just as easy to work with someone in Romania."

This trend has serious implications for San Francisco's, or any city's, ability to nurture multimedia. One interviewee believes that San Francisco will be the multimedia Mecca for about ten years, then the industry will disperse as costs drive it out. In many cases, emerging industries develop new products without much competition, and therefore, face no pressure to lower costs through location. But as competition increases and the ability to produce such a product spreads, so does the pressure to cut costs and relocate to cheaper areas.

Trends toward Concentration

On the other hand, the complexity and creativity of multimedia production will likely preserve a need for some physical proximity and a continued desire for urban amenities. Multimedia will continue to need the vast array of easily accessible service bureaus and supporting facilities, such as studio space. Multimedia productions requiring constant revisions, multiple usages of studio space, and numerous actors may need supporting facilities and labor to be nearby for the sake of speed. Production management may also need to be centralized to coordinate these activities.

Many of those interviewed stressed the value that they place on being part of a non-virtual community where ideas are exchanged face-to-face and shared cultural values are part of everyday life. One manager whose company recently worked virtually with a client and contractors believes that "the value of face-to-face meetings for interactive prototype sessions will not be replaced by video-conferencing." Another says that he prefers to have his contractors work in the office rather than as telecommuters because the "work is very interactive. Scenes need to be coherent since it's 3-D and real time. The creative process needs to be overseen."

One freelancer believes that only simple tasks, like having a specific piece of art work created, can be done "virtually." It seems likely that routine or simple projects will increasingly be done in locations where costs are lower. San Francisco, if it chooses, will continue to be attractive to that part of the multimedia industry that undertakes complex and creative projects.

These multimedia professionals feel that, on balance, multimedia will not become a completely "virtual" industry. They value the amenities of the City and gain value from their personal contacts here. They recognize that the multimedia industry needs to have an identification with a physical place and feel that San Francisco has been that place. As the industry evolves, San Francisco will need to understand and react to these changes in order to maintain its status within the industry.

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Factors Influencing Growth of Core Multimedia

High-speed lines are increasingly becoming a necessity for multimedia firms. Many interviewees believe that the industry will grow dramatically as technology improves. One of them predicted that once ". . . the ability to transport a lot of information across the Internet reaches the consumer market (cable-modems, Internet on TV), media-rich content will take off and South of Market will see a multitude of new Web-based multimedia companies emerge." As technology improves, the entire industry will expand as new uses and applications for multimedia come into existence.

Another benefit will be improved productivity for multimedia firms. Faster line speeds will directly impact a firm's ability to produce multimedia products and services. At the moment, firms working with large files are hindered by slow download times. Some types of files, such as high quality video, are impractical to move around on the Internet. In a high pressure, fast-paced industry such as multimedia, such constraints may be an enormous disadvantage. One interviewee summed it up as ". . . it's all about speed--the prototype cycle--make something, show the client, then back and forth for a given amount of time. The turnaround time will be lower, with better and cheaper products. How crucial is speed? The Internet has compressed everyone's time cycle. Anything you can do to cut time cycles will be decisive."

As communications technology advances, so will the importance of multimedia to the economy. Multimedia will merge with other forms of media such as television. Already, Web-tv allows one to access the Internet through a television. Several interviewees commented that this change will greatly increase the role of content providers and that this is where the money will be. Already, companies are rushing to enter into content. Microsoft, for example, is a partner in MSNBC, an early attempt to prepare for the convergence of television and the Internet. A shift toward content will require more writers, artists, actors, and other human resources as well as new institutions. These creative human resources are one of the attractions of San Francisco for the industry.

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Demand for investment capital, for instance, will increase as multimedia productions require larger budgets similar to those in the film industry. Moreover, investors will increasingly need to understand the content business. As in the film industry, a studio-like firm may be required to organize production and to arrange investors and financing. Lawyers, accountants, and other professionals specializing in content-related businesses, such as entertainment, will be increasingly needed. One of downtown San Francisco's strengths is its concentration of these kinds of professionals.

ISSUES FOR MULTIMEDIA IN SAN FRANCISCO

Several San Francisco industrial districts, once home to traditional manufacturing, are rapidly changing into creative districts of technology and innovation. These "new industry" districts include South of Market, the area north of Potrero Hill, and the Mission District, with the heaviest concentration in SOMA. Interviewees were asked what attracted them to their space and location, and what problems they saw. The biggest draw to these districts included low rents; easily transformed industrial warehouse space; an established community of artists, graphic designers, and film makers; an established infrastructure of fiber optic wiring and satellite dishes; meeting venues; studio space; and transportation connections to clients and services.

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Concentration

Multimedia is concentrated in dense, bustling parts of the city. During the interviews, almost every firm mentioned its attraction to the cafes and meeting venues of South Park or to area restaurants and meeting places. These public spaces are a critical juncture of the multimedia cluster with the arts communities. They serve as the forum for the deal making, marketing, and collaboration so critical to the project-based nature of multimedia work. This strong "meeting place" amenity helps define and focus many of the area's and the industry's strengths.

Interestingly, only a few multimedia firms located directly on the park itself. They are more likely to be in buildings in the blocks immediately around it. This reflects the dual need for low rents (found off the park) and proximity to informal meeting places which accommodate the "word-of-mouth" marketing upon which they depend.

Interviewees value the support services and clients located in the Financial District and the rest of downtown San Francisco. Several also mentioned easy access to face-to-face interaction with the global audience at the Moscone Convention Center and the Concourse Exhibition Center.

The multimedia industry has thrived in a well-defined, concentrated area of San Francisco. This "multimedia gulch" is the highly visible and colorful center of a much larger community throughout the Bay Area. Even with extensive electronic communications, there will be an ongoing need for face-to-face interaction within the industry, especially for the most advanced, creative, and innovative projects. The gulch is increasingly becoming a "front door" for investment. A less concentrated pattern would decrease the cluster's attractiveness to firms and its visibility to the outside world. How can San Francisco encourage multimedia to locate and expand in identified areas, and how can the City ensure that the urban services needed and desired are in place?

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Multimedia depends on the presence of San Francisco's innovative arts and technology communities. Some of these contributors to multimedia (designers, actors, and artists) can be vulnerable to changing economic conditions. Losing them would weaken the multimedia sector. The diversity of uses adds value to a San Francisco location for firms. The City may choose to actively protect this diversity and maintain this cultural mix.

Buildings

A comparison of the data base of multimedia firms in the South of Market to the Tax Assessor's records of building type shows that 86% of the buildings housing multimedia businesses are office or industrial buildings. Converted warehouse space is popular among multimedia firms, with over a third of all firms clustering in just thirteen such buildings. These thirteen buildings seem to serve as "incubators" of small start-up multimedia companies. They offer low rents, access to cabling, a highly desired casual industrial loft space atmosphere, high ceilings, and an adequate amount of space (3,000 square feet, on average) for the small, 5 to 10 person, companies which may temporarily double in size based on project needs. Firms in such space

forego offices for an open layout that downplays occupational hierarchy. Retail/Warehouse buildings housed 7% of the firms. Ten, or 2%, were located in residential buildings. Five (1%) were located in live/work buildings.

The interviews confirmed that converted industrial space is very attractive to multimedia firms. Several interviewees said that they looked for that type of space when locating and that large, flexible space with a specific image is important to them, both as a place to meet clients and as a place to spend long hours. One interviewee commented that her firm chose an open warehouse space because it fostered creativity. When asked to describe her firm's work space, she described it as "artistic, creative, multimedia-like style."

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The area north of Potrero Hill, to the South of SOMA, is becoming an alternative multimedia location as rents rise in SOMA. One of its attractions is its supply of industrial and warehouse space.

Infrastructure

Multimedia businesses need state-of-the-art communication infrastructure. This infrastructure has two components: fiber optic cables laid under city streets by telecommunications companies and connections from the curb to the building space. The installation of cables under the street is performed under permit from the Department of Public Works. DPW is beginning to actively track the nature and location of these installations but does not yet have complete information on the current state of the fiber optic network under city streets. The information that they have now is that the Financial District and the South of Market are well served by fiber optic cables. Other lines run through the City, linking it to the north and the Peninsula.

Some building owners have responded to this demand by connecting their buildings, but comprehensive information about building connections is not available. Multimedia firms themselves have taken creative steps to access this infrastructure by sharing and trading services.

Multimedia will itself drive private investment in communications infrastructure. The City could provide technical support by helping to organize demand and by collecting and sharing information about access to wiring. The collection and dissemination of information about existing and planned access to fiber optic facilities or the formation of purchasing cooperatives could make searches for office space with appropriate wiring easier.

Some interviewees suggested a "local area network" within a district which would connect multimedia companies and service providers to the existing fiber optic cables beneath the streets. Such a connection would increase the speed and efficiency of the multimedia production process. It would be analogous to a "local area network" in an office, where people's computers are linked to facilitate project-based work, yet the project team still has many formal and informal meetings.

Rents

A 1996 survey of commercial rents in the South of Market shows that multimedia firms paid an average of $1.00 per square foot per month. However, the rental rate necessary to create renovated office buildings is at least $2.50 per square foot fully serviced. Unrenovated buildings in the Gulch are currently getting $1.50 per square foot fully serviced. Over a quarter of surveyed firms indicated they would relocate or close if rents increased slightly (i.e., a 20% increase over a five year period), indicating their extreme vulnerability to changing economic conditions. Low rents are especially important for start-ups and small firms with low revenue streams.

As is always the case, some land uses are able and willing to pay more for space than others in th areas where multimedia firms have located. This can res in land use conflicts and may require public policy choic if policy makers believe that specific uses should be protected or promoted.

As is always the case, some land uses are able and willing to pay more for space than others in the areas where multimedia firms have located. This can result in land use conflicts and may require public policy choices if policy makers believe that specific uses should be

protected or promoted. Multimedia firms pay higher rents than some other uses in the area and lower than others. Traditional manufacturers typically paid lower rent than multimedia, averaging about $.50 to $.75 per square foot for garment manufacturing and printing. The survey found that many long-standing manufacturing firms are not able to renew their leases as building owners decide to invest in upgrading their properties to attract more profitable uses, including multimedia. Similarly, in some parts of South of Market, residential uses, where rents ranged up to $1.40 psf, can outbid multimedia businesses.

Many multimedia firms are willing to pay more for a South of Market space because of its amenities, convenience, and identification with the multimedia community, but the premium may not be large. Lower rents are an attraction to the area near Potrero Hill, where industrial/warehouse space is available at a lower price than SOMA. Emeryville was also mentioned as an alternative location. In order to retain a critical mass of firms and supporting services, suitable space at competitive costs must be available.

Multimedia businesses are often small, new, and rent sensitive. They are vulnerable to changing economic conditions due to the uncertain, risk-prone nature of their work. How can the City make sure that the office-warehouse space that they seek is available at affordable rent levels? The private market has been successful at providing space for multimedia over the last several years. How can the City ensure that the conditions that made this possible continue? Can the City encourage the development of low-cost incubator space for small start-up businesses?

Low rents are also critical to the population of artists upon which multimedia businesses depend for graphics, acting and film production. In addition to hiring artists, multimedia entrepreneurs consider a highly visible critical mass of creative people important for both inspiring innovation and for promoting San Francisco's identity as an arts,

culture, and technology center to clients and investors from around the globe.

Transportation

The attractions of a South of Market location include easy access to downtown firms and services and to Silicon Valley clients by CalTrain. The area near Potrero Hill and the north Mission has the advantage that, for now, it offers easier parking and less congested traffic conditions.

The areas where multimedia firms are concentrated are experiencing increased traffic and decreased parking because of economic growth and transportation system disruptions within downtown and citywide. The concerns of the interviewed firms were similar to those of any business. Some mentioned traffic congestion, lack of transit for employees, and lack of parking as problems. The solutions to these problems will neither be simple nor specific to multimedia. They will include the resolution of the Central Freeway closure, management of traffic associated with the new Ballpark, and continued attention to parking issues in downtown and the surrounding neighborhoods. A comprehensive approach to downtown transportation and parking problems is needed for all users of the area, including multimedia.

CONCLUSION

San Francisco has a competitive advantage in multimedia, and a healthy multimedia industry can have benefits for San Francisco. The skills involved in multimedia production match the skills of the labor pool and grow out of the City's strengths in technology and the arts. Multimedia firms value the amenities of the City and the contacts that can be made here with diverse potential suppliers, partners, and clients. They have found suitable spaces in older industrial, warehouse, and office buildings near to, but outside of, the Financial District.

San Francisco has a competitive advantage in multimedia, and a healthy multimedia industry can have benefits for San Francisco.

The enormous amount of interaction between diverse firms and individuals involved in multimedia means that the effects of job creation in multimedia, although not large in themselves, can have an especially beneficial economic impact. In other words, the employment and income multipliers will be relatively high since nearly all of the inputs and services are provided locally. (In contrast an assembly plant that imports all of its inputs from another region would generate very few local linkages.) Multimedia is also a prestigious industry, one that adds to San Francisco's reputation as an attractive, creative, and profitable place to do business.

Because of multimedia's specialized and creative nature, regulation of the industry and subsidies are not the most effective tools for encouraging it. Coordinated public-private efforts, using the expertise of people involved in multimedia, will be needed for San Francisco to maintain its lead in multimedia.

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